

Confronting COVID-19: Revisiting mask selection, use and care

11:00 am Aug 13, 2020

What we'll look at today

- types of masks and mask materials
- research on the effectiveness of masks to protect others
- research on the effectiveness of masks in protecting yourself
- effectiveness of various mask materials
- masks vs face shields
- mask care
- mask use requirements in Ontario
- using workplace mask policies to stop the spread

Types of masks

- three main types:
 - medical masks
 - respirators
 - cloth face coverings



Medical mask

- made of non-woven fabric created using melt blowing process
- usually three-ply material with melt-blown polymer (most often polypropylene) between non-woven fabric
- melt-blown acts as filter, stopping microbes from entering or exiting mask
- pleats allow mask to expand to cover area from nose to chin
- typically secured with ear loops, head ties or elastic straps



Medical mask classifications

- three classes of medical masks under American Society for Testing and Materials International (ASTM)
 - Level 1 (low) – venous pressure splash
 - Level 2 (moderate) – arterial pressure splash
 - Level 3 (high) – high-velocity procedures, orthopedic surgery



Respirators

- device designed to protect worker from inhaling hazardous atmospheres
- different types of respirators: some protect against particulates, others protect from gases or vapors
- must be fit tested, which ensures proper fit and seal between the respirator and the worker's face

N95 Masks

NOT MEDICAL



MEDICAL



This valve lets germs escape.

N95 respirators

- respirators with at least N95 certification recommended to protect worker from inhalation of infectious particles
- **N:** Respirator Rating Letter Class
 - stands for “Non-Oil” meaning if no oil-based particulates are present, mask can be used in work environment
- **95:** have a 95 per cent efficiency filtering particles larger than 0.3 microns
 - masks ending in 99 have a 99 per cent efficiency
 - masks ending in 100 are 99.97 per cent efficient, the same as HEPA quality filter

N95 respirators

- come in different shapes, some feature exhalation valves and should not be used for Covid 19
- consist of multiple layers of non-woven fabric, often made from polypropylene
- two outward protective layers, covering inside and outside of mask, are created using spun bonding
- between spun bond layers is a pre-filtration layer, which is thicker and stiffer, and is molded to form desired shape
- last layer is high efficiency melt-blown electret non-woven material that determines filtration efficiency



How N95 respirators work

- trap particles as they are forced to make twists and turns through dense network of material's fibers, which are as thin as one micron
- have electrostatically charged material to further attract particles
- two outer layers act as protection against outside environment as well as a barrier to anything in wearer's exhalations



N95 equivalents

➤ other respirators of equivalent standard approved for use in Canada:

- FFP2 and P3 (Europe)
- PFF2 and PFF3 (Brazil)
- P2 and P3 (Australia)
- Specialist 1 (Korea)
- N95, R95 and P95 (Mexico)
- KN/KP95 and 100 (China)



Comparing medical masks and non-medical N95 respirators

	Medical mask	N95 respirator
Testing and approval	<ul style="list-style-type: none"> cleared by Health Canada 	<ul style="list-style-type: none"> evaluated, tested and approved by NIOSH
Intended use and purpose	<ul style="list-style-type: none"> fluid resistant provides protection against large droplets, splashes or sprays. protects others from wearer's respiratory emissions 	<ul style="list-style-type: none"> reduces exposure to particles including small particle aerosols and large droplets (only non-oil aerosols)
Face seal fit	<ul style="list-style-type: none"> loose-fitting 	<ul style="list-style-type: none"> tight-fitting
Fit testing requirement	<ul style="list-style-type: none"> no 	<ul style="list-style-type: none"> yes
User seal check requirement	<ul style="list-style-type: none"> no 	<ul style="list-style-type: none"> yes required each time respirator is donned (put on)

Comparing medical masks and non-medical N95 respirators

	Medical mask	N95 respirator
Filtration	<ul style="list-style-type: none"> • does NOT provide reliable level of protection from inhaling smaller airborne particles • not considered respiratory protection 	<ul style="list-style-type: none"> • filters out at least 95% of airborne particles including large and small particles
Leakage	<ul style="list-style-type: none"> • occurs around edge of mask when user inhales 	<ul style="list-style-type: none"> • when properly fitted and donned, minimal leakage around edges of respirator when user inhales
Use limitations	<ul style="list-style-type: none"> • disposable • discard after each patient encounter 	<ul style="list-style-type: none"> • Ideally, discarded after each patient encounter or aerosol-generating procedure • discard when damaged or deformed; no longer forms effective seal; becomes wet, dirty or contaminated

Cloth face coverings

- purchased or home made
- minimum two layers but three are better
- completely cover nose and mouth
- fit securely to head with ties or ear loops
- may have pocket for additional, removable layer
- withstands washing in hot water without losing shape



Some fabrics are more suitable than others

Fabric	Filtration efficiency	Breathability	Filter quality factor
polypropylene	6	1.6	16.9
Cotton	5-26	4.5-17	5.4-7.6
Polyester	17	12.3	6.8
Cellulose	10-20	11-19	4.3-5.1
Silk	4	7.3	2.8
nylon	23	244	0.4

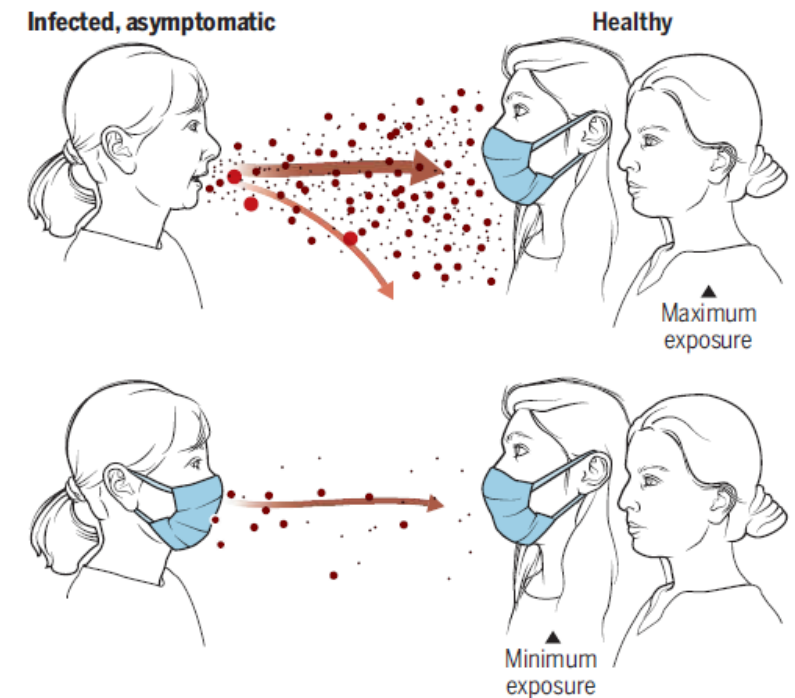
Wearing and care of your cloth face covering

- wash hands immediately before putting it on and immediately after taking it off (practice good hand hygiene while you are wearing the face covering)
- avoid moving the mask around or adjusting it often
- avoid touching the covering while using it
- do not share with others
- change covering when damp or soiled
- wash in hot water, disinfect in bleach solution, or boil for 1 minute, according to World Health Organization



Mask use decreases transmission of disease

- plumes of aerosols are generated by sneezing, coughing, speaking, or even exhaling
- masking reduces the volume of aerosols (and microorganisms) that may reach others
- COVID-19 patients may exhale millions of SARS-CoV-2 particles per hour
- individuals appear to shed more viral particles before or at the onset of symptoms than later in the disease



Do masks protect the wearer?



- personal protection a leading motivator for wearing a mask
- complex topic and still an active field of research
- complicated because the relative importance of various modes of transmission of SARS-CoV-2 is not yet fully understood
- work with influenza aerosols suggests that the realistic protection masks may offer is approximately twice that of being unprotected
- don't know if it is the same with SARS-CoV-19

Effectiveness of various masks

- COVID-19 is a serious illness with no established treatment or vaccine and is spreading causing deaths and strain on our health care system
- N95+ respirators ideal but should be reserved for health care workers
- medical or surgical masks, non-medical disposable and protective cloth masks, if worn by the public, can protect communities by limiting the infectious aerosols in the vicinity of all of us
- findings from numerous existing randomized controlled trials focusing on means to limit the spread of COVID-19 and other infectious diseases indicate that by wearing masks, both the wearer and the people around them are protected

Face shields

- easy to use, lightweight, and cannot be worn incorrectly
- cover the entire face and protect eyes, prevent touching face
- do not retain facial heat, or impact breathing resistance
- do not hide non-verbal facial cues, lip reading is possible, and voice less muffled



- prevent autoinoculation
- protection best when source is directly in front of shield
- surface ideal for adhesion of infectious virus
- protect the wearer, rather than others
- some people wear both

Mask storage

- medical and cloth masks can be reused in non-health care settings
- store face mask in a paper bag, envelope or something that won't retain moisture
- plastic bags are not recommended because they keep moisture in, which could allow bacteria to grow on the mask



Mask cleaning and disposal



- if face mask can be cleaned:
 - put directly into washing machine
 - wash hands after putting into washing machine
 - wash with other items with laundry detergent
 - dry thoroughly
- if face mask cannot be cleaned:
 - throw out into a lined garbage can when slightly wet or dirty

Ministry of Health mask recommendations

- wear covering over nose and mouth, without any gaps
- ensure at least two layers of tightly woven material that can be cleaned multiple times without losing its shape
- medical masks (surgical and N95) should be reserved for health care workers, those providing direct care, first responders and individuals who are ill and must leave their home for essential reasons
- cloth masks should not be placed on or used by children under the age of two, anyone who has trouble breathing and anyone who is unable to remove it without assistance



Mandatory mask requirements

- municipalities have instituted mask policies and by-laws
- by-laws typically require masks in all public and enclosed indoor spaces such as public transit, inside shops, grocery stores, malls
- mask by-laws typically do not apply to schools, childcare, colleges, universities, workplaces the public doesn't enter, or outside areas of a business (e.g., restaurant patio)

Workplace mask policies to stop the spread

- create a mask policy for workplace
- communicate policy to workers, customers, clients and visitors
- train workers on policy and who is exempt
- ensure workers, customers, visitors wear a mask indoors with some exceptions (children under two, people with certain health conditions, workers in designated areas or protected by a physical barrier)
- post signs at all entrances reminding everyone to wear a mask



WHSC training and resources

- now offering virtual classroom training
- includes the most popular programs, e.g., certification training for joint health and safety committee members
- new course on COVID-19
- register for our virtual classroom training on our website or by contacting one of our training services representatives



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